MASTER OF SCIENCE
IN
SYSTEMS TECHNOLOGY

A PROPOSED FIRE SUPPORT COMMUNICATION ARCHITECTURE FOR EXTENDING THE LITTORAL BATTLESPACE (ELB) ADVANCED CONCEPT TECHNOLOGY DEMONSTRATION (ACTD) '01

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Extending the littoral battlespace (ELB) is vital to the United States Navy and Marine Corps. Fast, accurate, and reliable fire support will continue to be essential to the execution of Operational Maneuver From the Sea (OMFTS) and Ship-To-Objective Maneuver (STOM). The emergence of new technology has made these concepts possible. Technology will allow Marines to reach their objectives faster and farther than ever before. Information gathering, dissemination, and targeting will be key factors to the success of these new concepts.

The development of low earth orbiting satellites that provide a seamless command, control, communications, and intelligence (C4I) network will be necessary for ELB. This network will provide worldwide coverage, emphasize light forces with the ability to connect to larger forces and have a near zero footprint. The emerging communication architectures must have the capacity for voice, data, and video handling from high to narrow bandwidth. Developing a "light" communications architecture that supports these emerging concepts will allow ELB to be responsive for joint operations in the twenty-first century.

DoD KEY TECHNOLOGY AREA: Command, Control, and Communications

KEYWORDS: Extending the Littoral Battlespace, Operational Maneuver From The Sea, Ship-To-Objective Maneuver, Low Earch Orbiting Satellites

SOF TACTICAL INTRANET: LOW PROBABILITY OF DETECTION, LOW PROBABILITY OF EXPLOITATION COMMUNICATIONS FOR SPECIAL OPERATIONS FORCES, USING A COMMERCIAL-OFF-THE-SHELF WIRELESS LOCAL AREA NETWORK

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Certain National and Navy tasked Special Operations Forces (SOF) missions require the rapid dissemination of available information to multiple disparate platforms. Current commercially available technologies allow the transmission of such data using lightweight, man portable ground stations with airborne relay platforms. The nature of these missions requires low probability of detection (LPD) communications for deployed forces with sufficient bandwidth and range to allow for rapid exchange of time critical intelligence and communications without indigenous infrastructure and with minimal possibility of compromising the position and intentions of SOF. The small, highly transportable nature of wireless LAN components, combined with the spread spectrum nature of their transmissions makes them appropriate for such scenarios.

The objective of this thesis is to demonstrate the feasibility of currently available COTS equipment to perform beyond envisioned design parameters, allowing its use in military applications. This demonstration includes development of a wireless computer network as a conduit for communications between airborne and ground units. The thesis performs both ground and in-flight evaluations to determine component configurations, utilizing a Systems Engineering approach to achieve maximum range while meeting minimum throughout requirements.

DoD KEY TECHNOLOGY AREAS: Command, Control, and Communications, Other (Special Operations)

KEYWORDS: C3, C4I, Wireless LAN, Communications, Special Operations

MICROSOFT OPERATING SYSTEMS DEVELOPMENT AND STRATEGY: AN ASSESSMENT OF THE WINDOWS 2000 SERVER OPERATING SYSTEM

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Microsoft began the development of Windows NT in the late 1980s as an applied research and development project. Since then it has become the number one network operating system on the market. With the release of Windows 2000, Microsoft has followed through on its strategy of operating system consolidation and formed a new family of servers. The Windows 2000 Server Family is the next generation of Windows NT and consolidates many of the features of Windows 95/98 into its operating system. This thesis examines the history of Microsoft and its strategy leading to the development of Windows 2000. It investigates the Windows 2000 Server Family editions, features and technologies introduced in the operating system. Then, methods of preparing an existing network for the deployment or migration to Windows 2000 are provided. A discussion of network security issues and features introduced by Windows 2000 is provided. This study provides IT managers with the background knowledge required to assess implementation issues surrounding Windows 2000.

DoD KEY TECHNOLOGY AREA: Computing and Software

KEYWORDS: Windows 2000, Network, Active Directory, Microsoft Management Console, Computer Security, Kerberos Authentication Protocol, Internet Security, Public Key Infrastructure

USING MTWS FOR HUMAN-IN-THE-LOOP C2 ORGANIZATIONAL EXPERIMENTS

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The Adaptive Architectures for Command and Control (A2C2) research project is examining issues in joint command and control, focusing on organizational adaptation. The project includes a series of "human-in-the-loop" experiments at the Naval Postgraduate School. The experiments are in three tiers, ranging from basic to applied/operational research, with tier-1 being the most basic. Four tier-1 experiments have been conducted to date, all employing the DDD-III simulator as the experimental driver. The DDD is designed for this type of research. It offers a high degree of control and supports on-line collection of data. It also involves a high level of abstraction, which is well suited to basic research. The basic A2C2 research will continue, but the research is also beginning to branch into the more operational/applied arena. The A2C2 team has selected the Marine Corps' MTWS as the experimental driver for tier-2 experiments and has installed MTWS at NPS. The fifth A2C2 experiment used MTWS to reexamine selected research questions from experiment four, focusing on the performance of Joint Task Force decision-makers in model based and traditional JTF architectures. The architectures used in experiment five resemble as closely as possible those used in experiment four.

DoD KEY TECHNOLOGY AREA: Command, Control, and Communications

KEYWORDS: C2, MTWS, Human-In-The-Loop, A2C2